

Hydronephrosis during Conservative Treatment for a Renal Injury Patient

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A 21-year-old male visited our emergency room. He could not remember the mechanism of injury. He was found beside a motorcycle. Initial vital sign was stable. Observation and conservative treatment were planned at the intensive care unit (ICU). On the third day at ICU, he complained sudden flank pain. It was colicky and hard to control. Without the pain, he had no specific symptom, sign, or laboratory findings. On computed tomography, renal pelvis was filled with hematoma which induced hydronephrosis. Double-J catheter and percutaneous nephrostomy was implemented by an intervention radiologist. Hematome in the renal pelvis was aspirated during the procedure. Symptom of the patient was subsided after the procedure. He was discharged without specific complications. [J Trauma Inj 2017; 30: 47-50]

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I. Introduction

It has been reported that low grade renal injury could be managed by conservative treatment.(1-3) Early complications of renal injury include bleeding, infection, perinephric abscess, and urinoma, while delayed complications include hydronephrosis, calculus formation, and arteriovenous fistula. Here we report a unique case of intrapelvic hematoma induced hydronephrosis on the third day of conservative treatment.

II. Case Report

A 21-year-old male visited our emergency room. Initial vital sign was stable. However, he showed drowsy mentality. Therefore, he was presumed to be

a drunk driver. He was found beside a motorcycle. He could not remember the mechanism of injury. On initial studies, left kidney injury (grade 3) and gross hematuria were identified (Fig. 1). Initial computed tomography (CT) revealed no hydronephrosis, urinary tract stone, or other urologically abnormal findings. Therefore, observation and conservative treatment were planned at intensive care unit (ICU). Infusion of tranexamic acid was started from the emergency room.

He was stable at ICU. He did not complain any specific symptom. On the third day at ICU, transfer to general ward was planned. However, suddenly he complained flank pain. The pain was colicky and repetitive. It was hard to control the pain even with continuous opioid dripping. He had no fever. His other vital signs were stable. Laboratory findings showed no specific changes from those obtained from emergency

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room (Table 1). To check unidentified or aggravated injury, computed tomography was done. Renal pelvis was found to be filled with hematoma which induced hydronephrosis (Fig. 2). Therefore, consultation with an intervention radiologist was provided to the patient. On nephrogram, segmental filling defects that imply hematoma were identified (Fig. 3). Double-J catheter and percutaneous nephrostomy were implemented (Fig. 4). Hematome in the renal pelvis was removed during the procedure. The symptom of the patient subsided after the procedure. Percutaneous nephrostomy was clamped 4 days after insertion and no symptom or sign related to hydronephrosis was happened. Drain was removed next day. At hospital day 9, he was transferred to a local hospital without specific complications.

III. Discussion

Kidney is the most commonly injured genitourinary organ.(4) Renal injury accounts for up to 10% of abdominal trauma.(5) It has been reported that more than 80% of renal injuries are due to blunt trauma.(2) Conservative management is recommended for grade 1–2 renal injuries.(1,3) Conservative treatment is also recommended for grade 3–4 renal injuries by the American Urological Association (AUA).(3) In addition, it has been reported that both penetrating trauma and blunt trauma can be treated conservatively.(6) Surgical treatment is only recommended for limited cases, such as hemodynamically unstable renal injury, pulsatile or expanding perirenal hematoma identified during laparotomy, and



Fig. 1. Initial CT showing left renal injury (grade 3).



Fig. 2. Follow-up CT showing dilated pelvis filled with hematoma.

Table 1. Result of laboratory examinations

Laboratory marker	Normal range	Initial	*HD #2	HD #3	HD #4
Hemoglobin	13.0-18.0	15.2	12.7	13.0	12.5
Hematocrit	40.0-54.0	44.5	37.8	37.7	35.9
Platelet	150-450	206	144	140	161
† ESR	0-10		3	33	56
† CRP	-0.3	0.03	1.66	7.76	8.37
§ BUN	8.0-20.0	11.0	7.9	6.3	7.1
Cr	0.5-1.3	1.04	0.93	0.87	0.77

* HD: hospital day

† ESR: erythrocyte sedimentation rate

† CRP: C-reactive protein

§ BUN: blood urea nitrogen

|| Cr: creatine

Normal range was made by department of laboratory medicine in author's institution.



Fig. 3. Segmental filling defects that imply hematoma were identified on nephrogram.

grade 5 renal vasculature injury.(4,7) Angioembolism might be used a treatment option for some hemodynamically unstable patient.

Although there are many possible complications during conservative management, one of the main concerns during conservative treatment is ongoing bleeding because it sometimes requires surgical treatment. Perinephric abscess and urinoma are other main concerns. They might need radiologic intervention. Initial impression of sudden flank pain might be caused by the problems mentioned above. These complications might become emergent. However, CT and laboratory findings showed that sudden flank pain in our patient was not caused by these complications.

Recommended CT follow-up might be different according to guidelines. Société Internationale d'Urologie (SIU) recommends no imaging for grade 1–3 injuries with CT follow-up at 36 to 72 hours after a grade 4 injury.(7) AUA recommends CT follow-up for grade 4–5 injuries after 48 hours.(3) European association of urology (EAU) recommends CT follow-



Fig. 4. Double-J-catheter and percutaneous nephrostomy catheter were inserted.

up for patient with fever, increasing flank pain, or falling hematocrit.(2) However, further evaluation might be needed to determine the timing and indications for CT follow-up. In the present case, CT follow-up was planned due to sudden uncontrolled flank pain and hydronephrosis induced by intrarenal hematoma.

Data about the incidence of post-traumatic hydronephrosis are scarce. There might be asymptomatic and unidentified patients with hydronephrosis.(8) Literature review results failed to show similar case to the case reported here. Many studies have presented hydronephrosis occurs without traumatic etiology. Some studies have reported ureter injury with iatrogenic causes.(9,10) Malik et al. have reported a rare hydronephrosis caused by displaced intrauterine contraceptive device.(11) Another study has reported spontaneous hydronephrosis in a child.(12) Lee et al. have reported hydronephrosis in a 20-year-old patient after a motorcycle accident.(13) Ureter edema with obstruction was revealed in retrograde pyelography and ureteroscopic examination in the case. It was treated with double-J-stenting. A case of pelvic hematoma in hydronephrotic kidney has been reported in a karate artist and the patient has been treated by nephrectomy.(14) Delayed nephrectomy due to recurrent infection of hydronephrotic kidney has also been reported.(8) Hydronephrosis is one of delayed complications.

However, in our case, it happened at three days after trauma. Although hydronephrosis induced by intrapelvic hematoma is rare, it should be diagnosed and managed properly so that the patient can be treated without specific complications.

In summary, we report a unique case of hydronephrosis induced by intrapelvic hematoma. When patient with renal injury complains sudden flank pain during the early period of conservative treatment, hydronephrosis might be the cause that should be considered. Further study is needed to determine the proper timing and indications of CT follow-up for renal injury.

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